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| 09/522,707      | 03/10/2000  | Kazumasa Hiramatsu   | 2185-0408P-SP       | 5987             |

7590 07/24/2002

Andrew D meikle  
Birch Stewart Kolasch & Birch LLP  
P.O. Box 747  
Falls Church, VA 22040-0747

EXAMINER

BAUMEISTER, BRADLEY W

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2815

DATE MAILED: 07/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
09/522,707

Applicant(s)  
Hiramatsu et al.

Examiner  
B. William Baumeister

Art Unit  
2815



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on May 8, 2002
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above, claim(s) 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) is/are objected to.
- 8) ☐ Claims are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on is/are a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on May 8, 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. .  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). .
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 11 6) ☐ Other:

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## **DETAILED ACTION**

### ***Election/Restriction***

1. Newly submitted claim 10 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

- I. Claims 1-9 are directed towards an epitaxial lateral overgrowth structure, classified in class 257, subclass 190.
- II. Claim 10 is directed towards a method of making an epitaxial lateral overgrowth structure, provisionally classified in class 438, subclass 1+

2. Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case unpatentability of the Group I invention would not necessarily imply unpatentability of the Group II invention, since the device of the group I invention could be made by processes materially different from those of the Group II invention. For example, as an alternative to using a vapor phase epitaxy process, the products could be made by using a liquid phase epitaxy process, such as set forth in Mauk.

a. Further, while independent product claim 1 has been amended to now recite that the product is formed by a vapor phase epitaxy method, this fact does affect the propriety of the restriction. This is because--as the following case law makes clear--that in claims directed

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towards a product, it is the patentability of the final product per se which must be determined, no matter how actually made. Further, an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or otherwise. *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wethheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al.*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964. Note that in such cases, the burden is on applicant to prove that claim language relating to the method of making the device results in a structural difference over the prior art.

b. In the REMARKS associated with amendment C, Applicant has made absolutely no assertion that the VPE process produces a product that is different than one produced by a LPE process. Rather, Applicant only alleges that the claims are now patentable because the Mauk reference "discloses a liquid phase epitaxy process, which is fundamentally different from the vapor phase epitaxy method disclosed and claimed in the present application." (Amendment C, Page 9.) Since applicant has not attempted to explain how this alternative method will produce any differences in the structure, the Examiner has no choice but to presume that the final structures will be the same regardless of the particular process employed. As such, whether the product claims recites VPE is immaterial to the issue of whether the restriction is proper.

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3. Because these inventions are distinct for the reasons given above, the inventions have acquired a separate status in the art because of their recognized divergent subject matter as shown by their different classification, the search required for Group II is not required for Group I, and separate examination would be required, restriction for examination purposes as indicated is proper.

a. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 10 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

***Claim Rejections - 35 USC § 102***

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1-3, 5, 6, 8 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Mauk '088. Mauk discloses epitaxial lateral overgrowth (ELOG) structures which employ an ELOG mask for growing III-V device layers over III-V epitaxial layers. The III-V layers may be composed of GaN or its alloys (i.e., AlGaInN) (e.g., col. 1, lines 40- and col. 6, lines 11-). The ELOG mask may be composed of metal such as tungsten or a multilayer structure composed of a metal and a dielectric layer (e.g., col. 5, lines 15- ; col. 6, lines 33- and col. 9, lines 1- ).

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a. Mauk does not disclose or discuss that GaN-based materials grown over tungsten masks will possess voids (claim 2) or have a particular x-ray rocking curve profile (claim 1). Nonetheless, since the voids and the rocking curve profile in applicant's invention are attributable to the mask being composed of an uppermost tungsten layer having mask and spacer widths above particular minimum thicknesses (see the specification e.g., pages 9-10), and because these widths are disclosed by Mauk (e.g., col. 5, lines 50- ), the structure of Mauk must also inherently or necessarily possess these features.

***Claim Rejections - 35 USC § 103***

6. Claims 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mauk '088.

a. Regarding claim 4: Assuming *arguendo* that the passage of Mauk setting forth GaN and its alloys must be read so narrowly as only disclosing GAN and InGaN--but not expressly disclosing Al(GaIn)N--thereby precluding an anticipation rejection, claim 4 would nonetheless still be obvious over Mauk. It was well known to those of ordinary skill in the art at the time of the invention to form LEDs, LDs and other electronic devices from AlN-based materials to produce devices having larger bandgaps, and it would have been specifically obvious for one of ordinary skill in the art to form the first epitaxial III-N layer of an AlN-based composition for the purpose of providing a substrate which would be better lattice-matched to the AlN-based epitaxial layers grown thereon.

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b. Regarding claim 7: As was mentioned, Mauk discloses that multilayer masks may be employed and expressly discloses metals such as tungsten on dielectric layers. Mauk does not appear to specifically state that the dielectric layer for such a multilayer mask should be SiO<sub>2</sub>. Nonetheless, it was well known to those of ordinary skill in the art at the time of the invention that SiO<sub>2</sub> is one of the most common materials employed as an ELOG mask in III-N semiconductor devices. This position is supported by applicant's prior art admissions (see e.g., FIG 1 and the BACKGROUND of the INVENTION section of the specification). Given that Mauk teaches metals over dielectrics, it would have been obvious to one of ordinary skill in the art at the time of the invention to specifically employ SiO<sub>2</sub> as the dielectric layer for any of the various reasons set forth in Mauk (such as to serve as a diffusion barrier) since this is the most common material already used, it is relatively inexpensive, and its chemical properties are well understood by those in the semiconductor industry.

### ***Response to Arguments***

7. Applicant's arguments filed 5/8/2002 have been fully considered but they are not persuasive. Applicant's only argument as to the propriety of the rejections over Mauk is that LPE is a fundamentally different process than VPE. See paragraph 2 above, relating to the product-by-process doctrine, for an explanation of why applicant's amendment does not overcome the prior art rejection.

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***Conclusion***

8. To the extent that an explanation of the product-by-process doctrine may constitute a new ground of rejection, Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.



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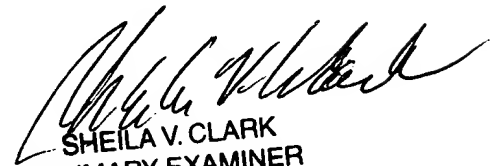
**INFORMATION ON HOW TO CONTACT THE USPTO**

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, **B. William Baumeister**, at **(703) 306-9165**. The examiner can normally be reached Monday through Friday, 8:30 a.m. to 5:00 p.m. If the Examiner is not available, the Examiner's supervisor, Mr. Eddie Lee, can be reached at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

B. William Baumeister

Patent Examiner, Art Unit 2815

July 21, 2002

  
SHEILA V. CLARK  
PRIMARY EXAMINER